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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,162	05/23/2001	Shlomi Arnon	C1113-7010	8807

37462 7590 01/30/2006

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EXAMINER

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ART UNIT PAPER NUMBER

2684

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] in view of Ariyavisitakul [US 5,936,754].

Regarding claims 1,15,29,31,37-39 Rutledge discloses a communication system with remote unit having microcell antenna units using free space optical communication links. Rutledge further discloses a base station transceiver system (BTS) positioned at a first location (see 30 in Fig.1) comprising of :

- Communication control circuitry, adapted to generate downlink radio frequency (RF) signals receivable by a mobile transceiver device operative within the cellular network and to process uplink RF signals transmitted by the mobile transceiver; see fig. 1 and col. 1, line 53 – col. 2, line 14
- First transducer circuitry (example 50a-50d), adapted to modulate a first beam of unguided electromagnetic (EM) radiation with the downlink RF signals and to radiate the modulated beam as a first modulated beam, and to receive and demodulate a second modulated beam of unguided EM radiation so as to recover the uplink RF signals; see Fig. 1, col. 3, lines 18-40

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Rutledge further discloses an antenna assembly, positioned at a second location remote from the first location (See Fig 1) comprising of :

- A second transducer circuitry (example 50a-50d), adapted to modulate a second beam of unguided EM radiation with the uplink RF signals and to radiate the modulated beam as second modulated beam to BTS, and to receive and demodulate the first modulated beam of unguided EM radiation from the BTS so as to recover the downlink RF signals; see Fig. 1, col. 3, lines 18-40
- An antenna adapted to radiate the recovered downlink RF signals to the mobile transceiver and to receive the uplink RF signals from the mobile transceiver (see col. 3, lines 18-40).

However, Rutledge fails to distinctly disclose a method where the signals from the remote antenna are analog modulated and transmitted over the optical link.

Ariyavisitakul, in the same field of endeavor, teaches a method where analog modulated signals are transmitted over the optical link. See col. 2, lines 43-58.

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to provide the above teachings of Ariyavisitakul to Rutledge in order to provide a cost effective optical link.

Regarding claims 2-4,16-18, Rutledge further discloses the first and second transducer circuitry adapted to radiate the first and second modulated beam via a path between the BTS and the antenna comprising of free space. See col. 3, lines 18-40

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Regarding claim 46, Rutledge discloses a method comprising a combiner adapted to add control or status information to the RF signals modulated onto the light beam. See col. 3, line 55 – col. 4, line 44.

Regarding claims 8, 22, Rutledge further discloses the system to comprise of a switching center (see MTSO in Fig. 1 and col. 3, lines 18-40), which is adapted to generate the information responsive to the uplink and downlink signals and to transfer the information between the BTS and cellular network.

3. Claims 5, 19, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] and Ariyavisitakul [US 5,936,754] in view of Westbrook [US 2004/0179852].

Regarding claims 5 and 19, Rutledge as treated in claims 1 and 15 does not disclose a specific range of distance between the base station and the remote antenna location.

Westbrook, in the same field of endeavor, teaches a method where the optical link between the central location and antenna remote sites is 30 m.

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to operate the system in the prescribed distance range for optimal performance of the system.

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Regarding claims 34 and 36, Westbrook further discloses a method where the optical link i.e. distance between the central location and remote antenna site of even 30km is possible thus indicating the positioning of the antenna assembly outside the coverage area of the BTS

1. Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] and Ariyavisitakul [US 5,936,754] in view of Zhou [US 6,188,808].

Regarding claims 6 and 20, Rutledge as treated in claims 1 and 15 does not disclose the wavelength of the EM waves.

However it is well known in the art to operate the EM in the range specified in claims 6 and 20 as taught by Zhou (see col. 7, lines 33-34 where the operating wavelength of the EM wave is 1.55 *um*).

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to operate the system in the prescribed frequency range for optimal performance of the system.

4. Claims 9, are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] and Ariyavisitakul [US 5,936,754] in view of Fischer [US 5,852,651]

Regarding claims 9, Rutledge as treated in claim 1 discloses all the limitations as claimed. However he does not specifically disclose a method where a base station controller controls the BTS.

However, it is well known in the art as taught by Fischer (see Fig. 1B, 3, col. 1, lines 60-63, col. 10, lines 17-21) that a base station controller controls the base station in order to synchronize

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the various base stations communicating with the mobile station and thus assists in the handoff situations.

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to use the base station controller taught by Fischer in the modified Rutledge invention in order to synchronize the various base stations communicating with the mobile station and thus assists in the handoff situations.

Regarding claims 10,24, Fischer further discloses where one of the downlink RF signals and uplink RF signals comprise a plurality of separate RF signals. (See Fig.1).

Regarding claims 11-14,25-28, Fischer further discloses the first and second transducer circuitry comprises of analog-to-digital converters and digital-to-analog converters and to further compress and de-compress digitized signals. See Figs. 4, 8, col. 10, line 33 – col. 11, line 25, col. 13, lines 1-35.

Regarding claims 30,32, Fischer further discloses a method providing one BTS per antenna assembly (see Fig. 2, where each BTS 106 is provided with a remote antenna system 102).

Regarding claim 33,35, Fischer further discloses a method to radiate the composite downlink RF signals to the mobile transceivers and to receive the composite up-link RF signals from the mobile cellular transceivers with a coverage area of the BTS. See col. 33, lines 29-49

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2. Claims 40,41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] and Ariyavisitakul [US 5,936,754] in view of Javitt [US 6,154,297].

Regarding claims 40,41, Rutledge as treated in claim 37 discloses all the limitations as claimed.

However he does not disclose a method wherein the beam generator comprises a laser and

further the beam generator comprises a source of incoherent optical radiation.

Javitt, in the same field of endeavor, teaches a method for optical communication wherein the

beam generator comprises a laser and further the beam generator comprises a source of

incoherent optical radiation. See col. 2, lines 28-67.

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to provide the above teaching of Javitt to the modified Rutledge invention in order to provide an improved and simplified optical link.

3. Claims 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge [EP 859 478 A2] and Ariyavisitakul [US 5,936,754] in view of examiner's official notice.

Regarding claims 42-45, Rutledge and Ariyavisitakul disclose all the limitations as claimed.

However, they fail to specifically disclose a particular type of modulation used to modulate the signals.

However it is well known in the art to use any of the modulation techniques specified in the claims 42-45.

Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to operate the system in any of the modulation techniques specified as a design choice for optimal performance of the system.

Response to Arguments

5. Applicant's arguments with respect to claims 1-6,8-20,22,24-46 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sujatha Sharma whose telephone number is 571-272-7886. The examiner can normally be reached on Mon-Fri 7.30am - 4.00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 571-272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sujatha Sharma
January 12, 2006

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